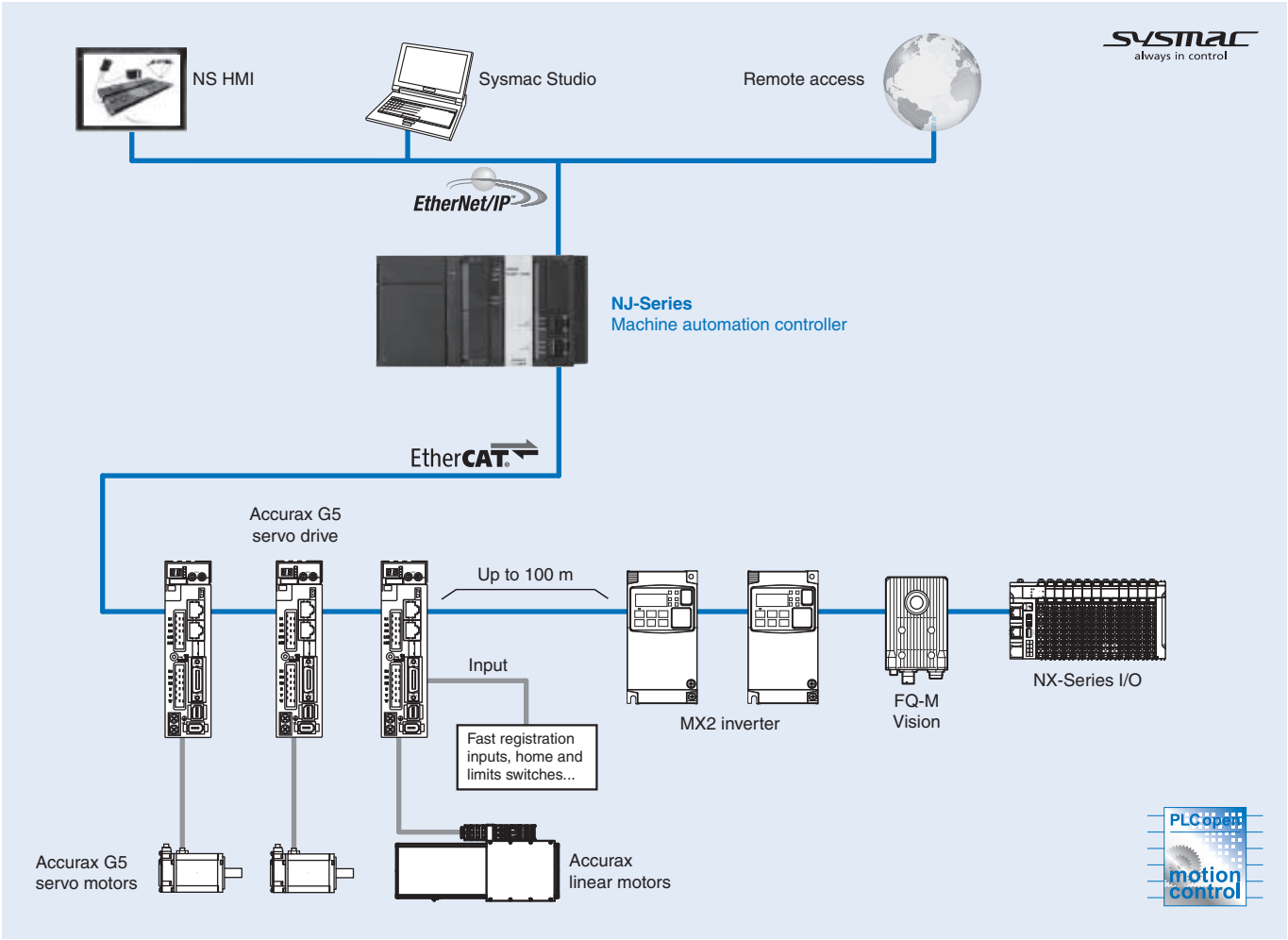
NJ3□, NJ5□

NJ-Series machine controller

Complete and robust machine automation
The NJ-Series is designed to meet extreme machine control requirements in terms of motion control speed and accuracy, communication, security and robustness.

- Integration of logic and motion in one Intel CPU
- Scalable control: CPUs for 4, 8, 16, 32 and 64 axes
- EtherCAT and EtherNet/IP ports embedded
- Fully conforms to IEC 61131-3 standards
- Certified PLCopen function blocks for motion control
- Linear, circular and spiral (helical) interpolation
- CPU units with SQL client and robotic functionality

System configuration



Specifications

General specifications

Item		NJ□ CPU Unit
Enclosure		Mounted in a panel
Grounding		Less than 100 Ω
CPU unit dimensions (H × D × W)		90 mm × 90 mm × 90 mm
Weight		550 g (including end cover)
Current consumption		5 VDC, 1.90 A (including SD Memory card and end cover)
Operation environment	Ambient operating temperature	0 to 55°C
	Ambient operating humidity	10% to 90% (with non condensation)
	Atmosphere	Must be free from corrosive gases
	Ambient storage temperature	–20 to 70°C (excluding battery)
	Altitude	2,000 m or less
	Pollution degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise immunity	2 kV on power supply line (conforms to IEC 61000-4-4.)
	Overvoltage category	Category II: Conforms to JIS B3502 and IEC 61131-2
	EMC immunity level	Zone B
	Vibration resistance	Conforms to IEC60068-2-6 5 to 8.4 Hz with 3.5 mm amplitude, 8.4 to 150 Hz. Acceleration of 9.8 m/s^2 for 100 min in X, Y and Z directions (10 sweeps of 10 min each = 100 min total)
	Shock resistance	Conforms to IEC60068-2-27 147 m/s^2, 3 times in X, Y and Z directions (100 m/s^2 for relay output units)
Battery	Life	5 years at 25°C
	Model	CJ1W-BAT01
Applicable standards		Conforms to cULus, NK, LR and EC directives.

Performance specifications (common specifications)

Item				NJ5□ CPU Unit			NJ3□ CPU Unit	
				NJ501-□5□0	NJ501-□4□0	NJ501-□3□0	NJ301-1200	NJ301-1100
Processing speed	Execution time	Ladder diagram instructions (LD, AND, OR and OUT)		1.9 ns min			3.0 ns min	
		Math instructions (LREAL)		26 ns min			42 ns min	
Programming	Program capacity*1			20 MB			5 MB	
	Memory capacity for variables	Retain attribute*2		2 MB			0.5 MB	
		No retain attribute*3		4 MB			2 MB	
	Memory for CJ-Series units (can be specified with AT specifications for variables.)	CIO area		6,144 words (CIO 0 to CIO 6143)				
		Work area		512 words (W0 to W511)				
		Holding area		1,536 words (H0 to H1535)				
		DM area		32,768 words (D0 to D32767)				
		EM area		32,768 words × 25 banks (E0_00000 to E18_32767)			32,768 words × 4 banks (E0_00000 to E3_32767)	
Unit configuration	Maximum number of connectable Units			Maximum per CPU rack or expansion rack: 10 units Entire controller: 40 units				
	Number of expansion racks			3 max.				
	I/O Capacity			2,560 points max. plus EtherCAT slave I/O capacity				
	Power supply to CPU rack and expansion racks	Model		NJ-P□3001 Power Supply Unit				
		Power OFF detection time	AC power supply	30 to 45 ms				
			DC power supply	22 to 25 ms				
Motion control	Number of controlled axes	Maximum number of axes		64 axes	32 axes	16 axes	8 axes	4 axes
		Linear interpolation control		4 axes max. per axes group				
		Circular interpolation control		2 axes per axes group				
	Number of axes groups			32 axes groups max.				
	Position units			Pulses, millimeters, micrometers, nanometers, degrees or inches				
	Override factors			0.00% or 0.01% to 500.00%				
	Motion control period			Same as process data communications period of EtherCAT communications				
	Cams	Number of cam data points		65,535 points max. per cam table 1,048,560 points max. for all cam tables			65,535 points max. per cam table 262,140 points max. for all cam tables	
		Number of cam tables		640 tables max.			160 tables max.	
Communications	Peripheral USB port	Supported services		Sysmac Studio connection				
		Physical layer		USB 2.0-compliant B-type connector				
		Transmission distance		5 m max.				
	Built-in EtherNet/IP port	Physical layer		10 Base-T or 100 Base-TX				
		Media access method		CSMA/CD				
		Modulation		Baseband				
		Topology		Star				
		Baud rate		100 Mbps (100 Base-TX)				
		Transmission media		Shielded, twisted-pair cable (STP): Category 5, 5e or higher				
		Transmission distance		100 m max. (distance between Ethernet switch and node)				
		Number of cascade connections		There are no restrictions if an EtherNet switch is used				

Item				NJ5□ CPU Unit			NJ3□ CPU Unit	
				NJ501-□5□0	NJ501-□4□0	NJ501-□3□0	NJ301-1200	NJ301-1100
Communications	Built-in EtherNet/IP port	CIP service: Tag data links (cyclic communications)	Number of connections	32				
			Packet Interval*4	10 to 10,000 ms in 1.0-ms increments. Can be set for each connection. (Data will be refreshed at the set interval, regardless of the number of nodes.)				
			Permissible communications band	1,000 pps*5 including heartbeat				
			Number of tag sets	32				
			Tag types	Network variables (CIO, Work, Holding, DM and EM Areas.)				
			Number of tags	8 (Seven tags if controller status is included in the tag set.)				
			Maximum link data size per node	19,200 bytes (total size for all tags.)				
			Maximum data size per connection	600 bytes (note: Data concurrency is maintained within each connection.)				
			Number of registrable tag sets	32 (1 connection = 1 tag set)				
			Maximum tag set size	600 bytes (two bytes are used if Controller status is included in the tag set.)				
			Changing tag data link parameters	Supported.*2 (when controller is in RUN mode)				
			Multi-cast packet filter*6	Supported.				
		CIP message service: Explicit messages	Class 3 (number of connections)	32 (clients plus server)				
			UCMM (non-connection type)	Number of clients that can communicate at one time: 32 max. Number of servers that can communicate at one time: 32 max.				
			CIP routing	Supported. Units through which CIP routing is supported: CS1W-EIP21, CJ1W-EIP21, CJ2H-CPU□□-EIP and CJ2M-CPU3□				
	Built-in EtherCAT port	Communications standard		IEC 61158, Type 12				
		EtherCAT master specifications		Class B (feature pack motion control compliant)				
		Physical layer		100 Base-TX				
		Modulation		Baseband				
		Baud rate		100 Mbps (100 Base-TX)				
		Duplex mode		Automatic				
		Topology		Line, daisy chain and branching				
		Transmission media		Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)				
		Transmission distance		Distance between nodes: 100 m max.				
		Maximum number of slaves		192				
		Maximum process data size		Inputs: 5,736 bytes Outputs: 5,736 bytes However, the maximum number of process data frames is 4.				
		Maximum process data size per slave		Inputs: 1,434 bytes Outputs: 1,434 bytes				
		Communications period		500, 1000, 2000 or 4000 μs			1000, 2000 or 4000 μs	
		Sync jitter		1 μs max.				
Internal clock				At ambient temperature of 55°C: –3.5 to 0.5 min error per month At ambient temperature of 25°C: –1.5 to 1.5 min error per month At ambient temperature of 0°C: –3 to 1 min error per month				

*1. This is the capacity for the execution objects and variable tables (including variable names).

*2. Words for CJ-series units in the holding, DM and EM areas are not included.

*3. Words for CJ-series units in the CIO and work areas are not included.

*4. Data is updated on the line in the specified interval regardless of the number of nodes.

*5. Means packets per second, i.e., the number of communications packets that can be sent or received in one second.

*6. An IGMP client is mounted for the EtherNet/IP port. If an Ethernet switch that supports IGMP snooping is used, filtering of unnecessary multicast packets is performed.

Performance specifications for CPU units with robotic functionality

Item			NJ5□ CPU Unit		
			NJ501-4500	NJ501-4400	NJ501-4300
Motion control	Robotics	Delta robot	3 + 1 (optional rotational axis) axes per robot		
		Number of delta robots	8 Delta robots max. (depending on the number of axes supported by the CPU)		

Performance specifications for CPU units with SQL server

Item			NJ5□ CPU Unit		
			NJ501-1520	NJ501-1420	NJ501-1320
Programming	Memory for CJ-series units (can be specified with AT specifications for variables)	EM area	32,768 words × 25 banks*1 (E0_00000 to E18_32767)		

*1. When the spool function is enabled, the DB connection service uses E9_0 to E18_32767.

Function specifications (common specifications)

Item				NJ□ CPU Unit
Tasks	Function			I/O refresh and the user program can be executed in 2 type of tasks: • Primary periodic task: This task has the highest priority. It is always executed in the specified period. There is only one primary periodic task. • Periodic tasks: Periodic tasks are executed during the unused time between executions of the primary periodic task. There can be three periodic tasks.
	Setup	System service times		The execution interval and the percentage of the total user program execution time are set for the system services (processes that are executed by the CPU Unit separate from task execution).
Programming	POUs (program organization units)	Programs		POUs that are assigned to tasks.
		Function blocks		POUs that are used to create objects with specific conditions.
		Functions		POUs that are used to create an object that determine unique outputs for the inputs, such as for data processing.
	Programming languages	Types		Ladder diagrams *1 and structured text (ST).
	Variables	External access of variables		Network variables (the function which allows access from the HMI, host computers or other controllers)
	Array attribute	Array variables	Function	An array groups data with the same attributes so that it can be handled as a single unit of data. Number of dimensions: 3 max. Maximum number of elements: 65,535 Maximum size: No restrictions. (They are capacity restrictions to the total data size of variables.)
			Array specifications for FB instances	Supported.
			Range specifications	You can specify a range for a data type in advance. The data type can take only values that are in the specified range.
	Data types	Basic data types		BOOL, BYTE, WORD, DWORD, LWORD, INT, SINT, DINT, LINT, UINT, USINT, UDINT, ULINT, REAL, LREAL, TIME (durations), DATE, TIME_OF_DAY, DATE_AND_TIME, and STRING (text strings.)
		Directive data types	Direct derivative types	Structures, unions, enumerations
			Member data types	Basic data types, structures, unions, enumerations, array variables.
		Structures	Function	A derivative data type that groups together data with different variable types. Number of members: 2,048 max. Nesting levels: 8 max. Number of registered structures: No restrictions. Maximum size: No restrictions.
			Specifying member offsets	You can use member offsets to place structure members at any memory locations. *2
		Unions	Function	A derivative data type that enables access to the same data with different data types. Number of members: 4 max.
			Member data types	BOOL, BYTE, WORD, DWORD or LWORD.
		Enumerations	Function	A derivative data type that uses text strings called enumerators to express variable values.
Motion control functions	Control modes			Position control, velocity control, torque control
	Axis types			Servo axes, virtual servo axes, encoder axes and virtual encoder axes
	Positions that can be managed			Command positions and actual positions
	Single axis	Single-axis position contol	Absolute positioning	Positioning is performed for a target position that is specified with an absolute value.
			Relative positioning	Positioning is performed for a specified position from the command current position.
			Interrupt feeding	Positioning is performed for a specified travel distance from the position where an interrupt input was received from an external input.
		Single-axis velocity control	Velocity control	Velocity control is performed in position control mode.
			Cyclic synchronous velocity control	A velocity command is output each control period in the velocity control mode.
		Single-axis torque control	Torque control	The torque of the motor is controlled.
		Single-axis synchronized control	Starting cam operation	A cam motion is performed using the specified cam table.
			Ending cam operation	The cam motion for the axis that is specified with the input parameter is ended.
			Starting gear operation	A gear motion with the specified gear ratio is performed between a master axis and slave axis.
			Positioning gear operation	A gear motion with the specified gear ratio and sync position is performed between a master axis and slave axis.
			Ending gear operation	The specified gear motion or positioning gear motion is ended.
			Synchronous positioning	Positioning is performed in sync with a specified master axis.
			Master axis phase shift	The phase of a master axis in synchronized control is shifted.
			Combining axes	The command positions of two axes are added or subtracted and the result is output as the command position.
		Single-axis manual operation	Powering the servo	The servo in the servo drive is turned ON to enable axis motion.
			Jogging	An axis is jogged at a specified target velocity.

Item				NJ□ CPU Unit
Motion control functions	Single axis	Auxiliary functions for single-axis control	Resetting axis errors	Axes errors are cleared.
			Homing	A motor is operated and the limit signals, home proximity signal, and home signal are used to define home.
			High-speed homing	Positioning is performed for an absolute target position of 0 to return to home.
			Stopping	An axis is decelerated to a stop.
			Immediately stopping	An axis is stopped immediately.
			Setting override factors	The target velocity of an axis can be changed.
			Changing the current position	The command current position or actual current position of an axis can be changed to any position.
			Enabling external latches	The position of an axis is recorded when a trigger occurs.
			Disabling external latches	The current latch is disabled.
			Zone monitoring	You can monitor the command position or actual position of an axis to see when it is within a specified range (zone).
			Monitoring axis following error	You can monitor whether the difference between the command positions or actual positions of two specified axes exceeds a threshold value.
			Resetting the following error	The error between the command current position and actual current position is set to 0.
			Torque limit	The torque control function of the Servo Drive can be enabled or disabled and the torque limits can be set to control the output torque.
	Axes groups	Multi-axes coordinated control	Absolute linear interpolation	Linear interpolation is performed to a specified absolute position.
			Relative linear interpolation	Linear interpolation is performed to a specified relative position.
			Circular 2D interpolation	Circular interpolation is performed for two axes.
			Axes group cyclic synchronous absolute positioning	A positioning command is output each control period in Position control mode.*2
		Auxiliary functions for multi-axes coordinated control	Resetting axes group errors	Axes group errors and axis errors are cleared.
			Enabling axes groups	Motion of an axes group is enabled.
			Disabling axes groups	Motion of an axes group is disabled.
			Stopping axes groups	All axes in interpolated motion are decelerated to a stop.
			Immediately stopping axes groups	All axes in interpolated motion are stopped immediately.
			Setting axes group override factors	The blended target velocity is changed during interpolated motion.
			Reading axes group positions	The command current positions and actual current positions of an axes group can be read.*2
			Changing the axes in a axes group	The composition axes parameter in the axes group parameters can be overwritten temporarily.*2
	Common items	Cams	Setting cam table properties	The end point index of the cam table that is specified in the input parameter is changed.
			Saving cam tables	The cam table that is specified with the input parameter is saved in non-voltage memory in the CPU unit.
		Parameters	Writing MC settings	Some of the axis parameters or axes group parameters are overwritten temporarily.
	Auxiliary functions	Count modes		You can select either linear mode (finite length) or rotary mode (infinite length).
		Unit conversions		You can set the display unit for each axis according to the machine.
		Acceleration/ deceleration control	Automatic acceleration/ deceleration control	Jerk is set for the acceleration/deceleration curve for an axis motion or axes group motion.
			Changing the acceleration and deceleration rates	You can change the acceleration or deceleration rate even during acceleration or deceleration.
		In-position check		You can set an in-position range and in-position check time to confirm when positioning is completed.
		Stop mode		You can set the Stop Mode to determine when the immediate stop input signal or limit input signal is valid.
		Re-execution of motion control functions		You can change the input variables for a motion control instruction during execution and execute the instruction again to change the target values during operation.
		Multi-execution of motion control instructions (buffer mode)		You can specify when to start execution and how to connect the velocities between operations when another motion control instruction is executed during operation.
		Continuous axes group motions (transition mode)		You can specify the transition mode for multi-execution of instructions for axes group operation.

Item				NJ□ CPU Unit
Motion control functions	Auxiliary functions	Monitoring functions	Software limits	The movement range of an axis is monitored.
			Following error	The error between the command current value and the actual current value is monitored for each axis.
			Velocity, acceleration rate, deceleration rate, torque, interpolation velocity, interpolation acceleration rate, and interpolation deceleration rate	You can set warning values for each axis and each axes group to monitor them.
		Absolute encoder support		You can use an OMRON G5-Series Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup.
	External interface signals			The following Servo Drive input signals are used. Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal and interrupt input signal.
Unit (I/O) management	CJ-Series units	Maximum number of units		40
		Basic I/O units	Chattering and noise countermeasures	Input response times are set.
			Load short-circuit protection and I/O disconnection detection	Alarm information for basic I/O units is read.
	EtherCAT slaves	Maximum number of slaves		192
		Basic I/O	Chattering and noise countermeasures	Input response times are set.
Communications	Peripheral USB port			A port for communications with various kinds of support software running on a personal computer.
	EtherNet/IP port	Communication protocol		TCP/IP, UDP/IP
		CIP communications service	Tag data links	Programless cyclic data exchange is performed with the devices on the EtherNet/IP network.
			Message communications	CIP commands are sent to or received from the devices on the EtherNet/IP network.
		TCP/IP applications	Socket services	Data is sent to and received from any node on EtherNet using the UDP or TCP protocol. Socket communications instructions are used.
			FTP server	Files can be read from or written to the SD memory card in the CPU unit from computers at other Ethernet nodes.
			Automatic clock adjustment	Clock information is read from the NTP server at the specified time or at specified interval after the power supply to the CPU unit is turned ON. The internal clock time in the CPU unit is updated with the read time.
			SNMP agent	Built-in EtherNet/IP port internal status information is provided to network management software that uses an SNMP manager.
	EtherCAT port	Process data communications		Control information is exchanged in cyclic communications between the EtherCAT master and slaves.
		SDO communications		Control information is exchanged in noncyclic event communications between the EtherCAT master and slaves. SDO communications that are defined in the CANopen standard are used.
		Network scanning		Information is read from connected slave devices and the slave configuration is automatically generated.
		DC (distributed clock)		Time is synchronized by sharing the EtherCAT system time between all EtherCAT devices (including the master).
		Packet monitoring (only NJ5)		The frames that are sent by the master and the frames that are received by the master can be saved. The data that is saved can be viewed with WireShark or other applications.
		Enable/disable settings for slaves		The slaves can be enabled or disabled as communications targets.
		Disconnecting/connecting slaves		Temporarily disconnects a slave from the EtherCAT network for maintenance, such as for replacement of the slave and then connects the slave again.
		Supported application protocol	CoE	SDO messages that conform to the CANopen standard can be sent to slaves via EtherCAT.
	Communications instructions			The following instructions are supported: CIP communications instructions, SDO message instructions, no-protocol communications instructions, and protocol macro instructions.
Operation management	RUN output contacts			The NJ-P□3001 power supply unit turns ON in RUN mode.
System management functions	Event logs	Categories		Events are recorded in the following logs: • System event log • Access event log • User-defined event log
		Maximum number of events per event log		NJ5: 1,024 NJ3: 512

Item				NJ□ CPU Unit
Debugging	Online editing			Programs, function blocks, functions and global variables can be changed online, individual POUs can be changed by more than worker working across a network.
	Forced refreshing	Forced refreshing		The user can force specific variables to TRUE or FALSE.
		Maximum number of forced variables	Device variables for EtherCAT slaves	64
			Device variables for CJ-series units and variables with AT specifications	64
	MC test Run			Motor operation and wiring can be checked from the Sysmac Studio.
	Synchronization			The project file in the Sysmac Studio and the data in the CPU unit can be made the same when online.
	Data tracing	Types	Single triggered trace	When the trigger condition is met, the specified number of samples are taken and then tracing stops automatically.
			Continuous trace	Data tracing is executed continuously and the trace data is collected by the Sysmac Studio.
		Maximum number of simultaneous data trace		NJ5: 4 NJ3: 2
		Maximum number of records		10,000
		Sampling	Maximum number of sampled variables	NJ5: 192 variables NJ3: 48 variables
		Timing of sampling		Sampling is performed for the specified task period, at the specified time or when a sampling instruction is executed.
	Data tracing	Triggered traces	Triggered traces	Trigger conditions are set to record data before and after an event.
			Trigger conditions	When BOOL variable changes to TRUE or FALSE. Comparison of non-BOOL variable with a constant. Comparison method: Equals (=), greater than (>), greater than or equals (≥), less than (<), less than or equals (≤), not equal (≠).
			Delay	Trigger position setting: A slider is used to set the percentage of sampling before and after the trigger condition is met. (Example: 20%/80%).
	Simulation			The operation of the CPU unit is emulated in the Sysmac Studio.
Maintenance	Connection to HMIs	Connected port		Built-in EtherNet/IP port.
	Sysmac Studio connection	Connected port		Peripheral USB port or built-in EtherNet/IP port.
Reliability functions	Self-diagnosis	Controller errors	Levels	Major fault, partial fault, minor fault, observation and information.
			Maximum number of message languages	2
		User-defined errors	User-defined errors	User-defined errors are registered in advance and then records are created by executing instructions.
			Levels	8 levels
			Maximum number of message languages	9
Security	Protecting software assets and preventing operating mistakes	CPU unit names and serial IDs		When going online to a CPU Unit from the Sysmac Studio, the CPU Unit name in the project is compared to the name of the CPU Unit being connected to.
		Protection	User program transfer with no restoration information	You can prevent reading data in the CPU unit from the Sysmac Studio.
			CPU unit write protection	You can prevent writing data to the CPU unit from the Sysmac Studio or SD memory card.
			Overall project file protection	You can use passwords to protect .smc files from unauthorized opening on the Sysmac Studio.
			Data protection	You can use passwords to protect POUs on the Sysmac Studio. *2
		Verification of operation authority	Verification of operation authority	Online operations are restricted by operation rights to prevent damage to equipment or injuries that may be caused by operating mistakes.
			Number of groups	5 *3
		Verification of user program execution ID		The user program cannot be executed without entering a user program execution ID from the Sysmac Studio for the specific hardware (CPU unit).
SD memory card functions	Storage type			SD memory card (2GB max.), SDHC memory card
	Application	SD memory card operation instructions		You can access SD memory cards from instructions in the user program.
		File operations from the Sysmac Studio		You can perform file operations for Controller files in the SD memory card and read/write standard document files on the computer.
		SD memory card life expiration detection		Notification of the expiration of the life of the SD memory card is provided in a system-defined variable and event log.

*1. Inline ST is supported. (Inline ST is ST that is written as an element in a ladder diagram).

*2. Supported only by the CPU units with unit version 1.01 or later.

*3. When the NJ501 CPU units with unit version 1.00 is used, this value becomes two.

Function specifications for CPU units with SQL server

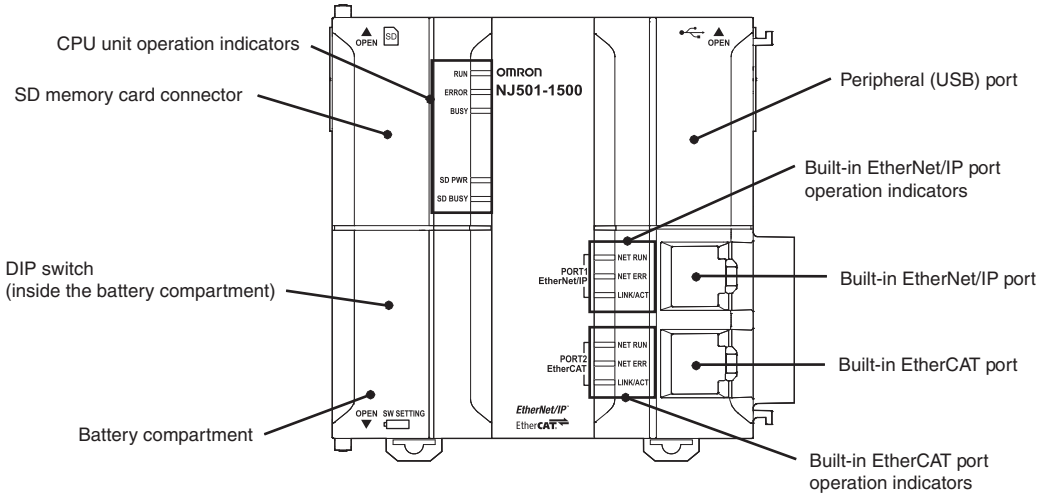
Item		NJ501-1□20 CPU Unit
Supported port		Built-in EtherNet/IP port
Supported DB		Microsoft Corporation: SQL Server 2008/2008 R2/2012 Oracle Corporation: Oracle Database 10g/11g
Number of DB connections (number of databases that can be connected at the same time)		3 connections max.*1
Instruction	Supported operations	The following operations can be performed by executing DB connection instructions in the NJ-series CPU units. Inserting records (INSERT), updating records (UPDATE), retrieving records (SELECT) and deleting records (DELETE)
	Number of columns in an INSERT operation	SQL server: 1,024 columns max. Oracle: 1,000 columns max.
	Number of columns in an UPDATE operation	SQL server: 1,024 columns max. Oracle: 1,000 columns max.
	Number of columns in a SELECT operation	SQL server: 1,024 columns max. Oracle: 1,000 columns max.
	Number of records in the output of a SELECT operation	65,535 elements max. 4 MB max.
Run mode of the DB connection service		Operation mode or Test mode: • Operation mode: when each instruction is executed, the service actually accesses the DB. • Test mode: when each instruction is executed, the service ends the instruction normally without accessing the DB actually.
Spool function		Used to store the SQL statements when an error occurred and resend the statements when the communications are recovered from the error. Spool capacity: 1 MB*2
Operation log function		The following three types of logs can be recorded: • Execution log: Log for tracing the executions of the DB connection service. • Debug log: Detailed log for SQL statement executions of the DB connection service. • SQL execution failure log: Log for execution failures of SQL statements in the DB.
DB connection service shutdown function		Used to shut down the DB connection service after automatically saving the operation log files into the SD memory card.

*1. When two or more DB connections are established, the operation cannot be guaranteed if you set different database types for the connections.

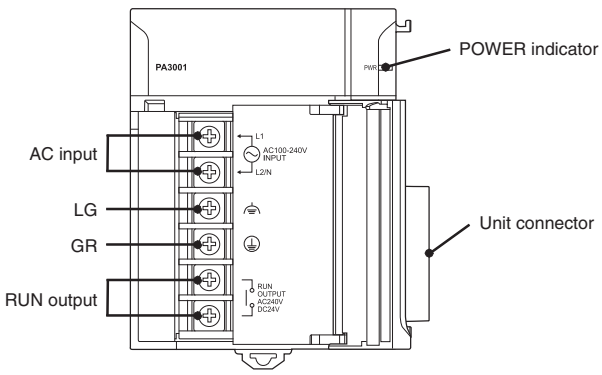
*2. Refer to “NJ-Series database connection CPU units user’s manual (W527)” for more information.

Nomenclature

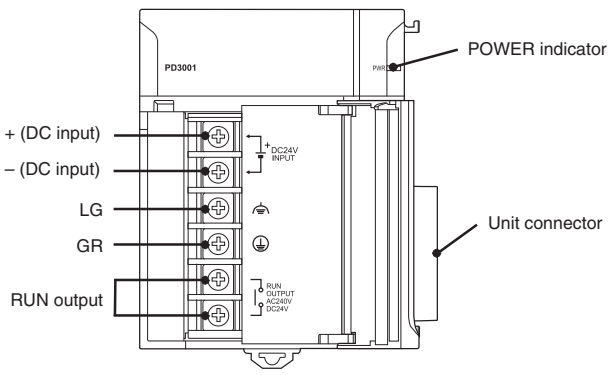
CPU unit (NJ501/301-□□□□)



100 to 240 VAC power supply unit (NJ-PA3001)

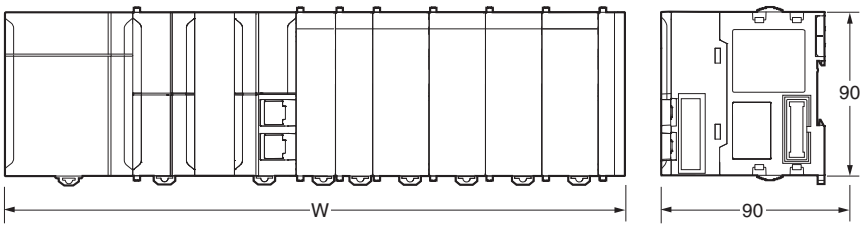


24 VDC power supply unit (NJ-PD3001)



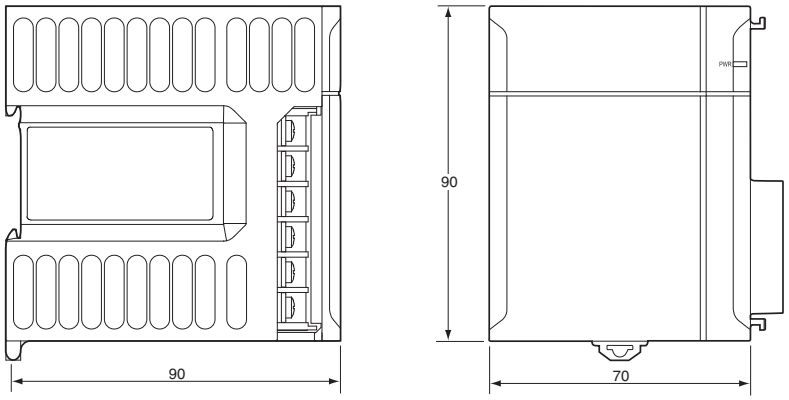
Dimensions

NJ-Series system (NJ-P□3001 + NJ501/301-□□□□ + one I/O unit + CJ1W-TER01)

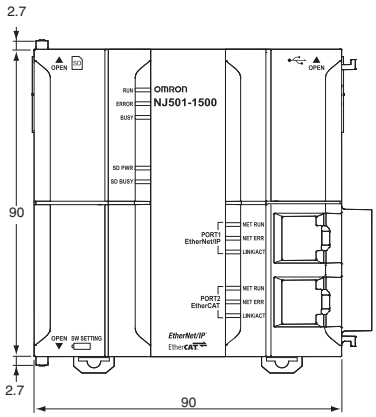


No. of units mounted with 31-mm width	Rack width (mm)
	With NJ501/301-□
1	205.7
2	236.7
3	267.7
4	298.7
5	329.7
6	360.7
7	391.7
8	422.7
9	453.7
10	484.7

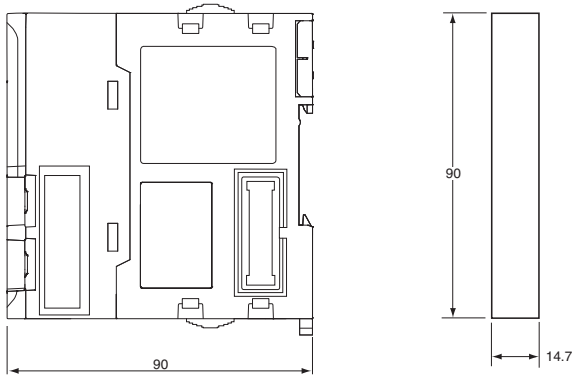
Power supply unit (NJ-PA3001/PD3001)



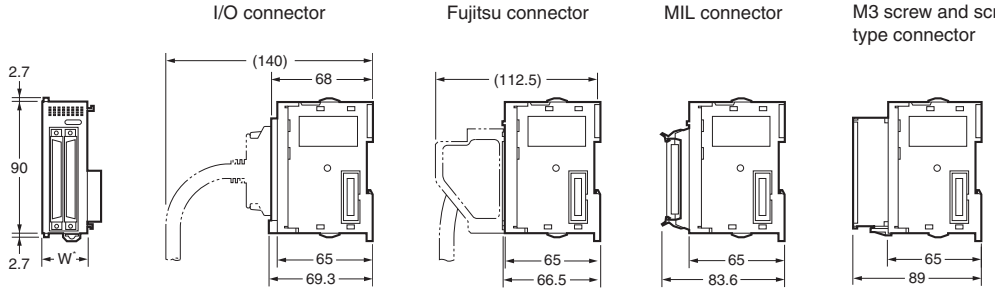
CPU unit (NJ501/301-□□□□)



End cover (CJ1W-TER01)

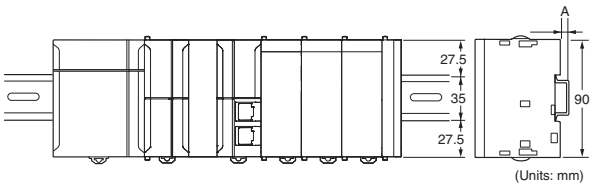


CJ units



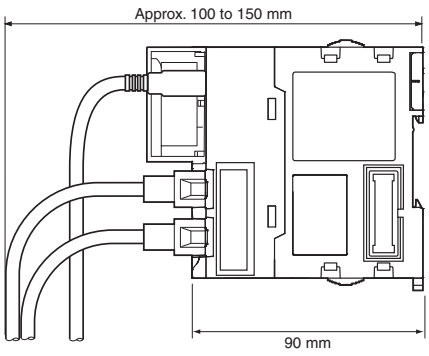
* Refer to the CJ unit tables in the ordering information section for the specific unit width.

Mounting dimensions

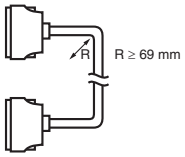


DIN track model number	A
PFP-100N2	16 mm
PFP-100N	7.3 mm
PFP-50N	7.3 mm

Mounting height



Expansion cable



Note: 1. Consider the following points when expanding the configuration:
- The total length of I/O connecting cable must not be exceed 12 m.
- I/O Connecting cables require the bending radius indicates below.

2. Outer diameter of expansion cable: 8.6 mm.

Power supply units current consumption

Checking current and power consumption

After selecting a power supply unit based on considerations such as the power supply voltage, calculate the current and power requeriments for each rack.

Condition 1: Current requirements
There are two voltage groups for internal power consumption: 5 V and 24 V.
Current consumption at 5 V (internal logic power supply)
Current consumption at 24 V (relay driving power supply)

Condition 2: Power requirements
For each rack, the upper limits are determined for the current and power that can be provided to the mounted units. Design the system so that the total current consumption for all the mounted units does not exceed the maximum total power or the maximum current supplied for the voltage groups shown in the following tables.
The maximum current and total power supplied for CPU racks and expansion racks according to the power supply unit model are shown below.

Power supply Units	Max. current supplied			(C) Max. total power supplied
	(A) 5-VDC CPU Racks*	(A) 5-VDC expansion rack	(B) 24 VDC	
NJ-PA3001	6.0 A	6.0 A	**1.0 A**	30 W
NJ-PD3001	6.0 A	6.0 A	**1.0 A**	30 W

Conditions 1 and 2 are below must be satisfied.
Condition 1: Maximum current
(1) Total unit current consumption at 5 V ≤ (A) value
(2) Total unit current consumption at 24 V ≤ (B) value
Condition 2: Maximum power
(1) x 5 V + (2) x 24 V ≤ (C) value

* Including supply to the CPU unit.

Note: 1. For CPU racks, include the CPU unit current and power consumption in the calculations. When expanding, also include the current and power consumption of the I/O control unit in the calculations.
2. For expansion racks, include the I/O interface unit current and power consumption in the calculations.

Example: Calculating total current and power consumption

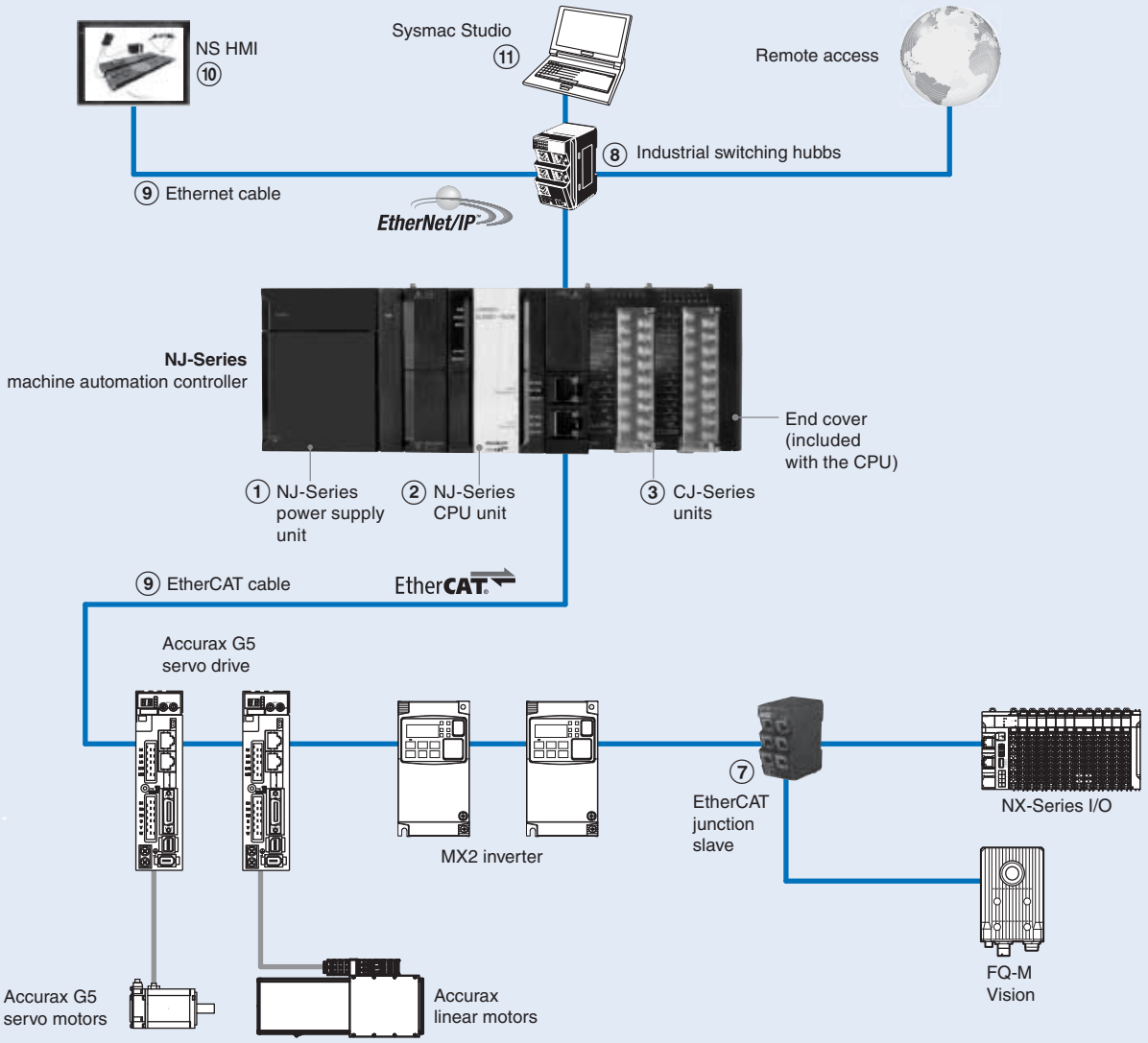
When the following units are mounted to a NJ-Series CPU rack using a NJ-PA3001 power supply unit.

Unit type	Model	Quantity	Voltage group	
			5 V	24 V
CPU unit	NJ501-1500	1	1.90 A	–
I/O control unit	CJ1W-IC101	1	0.02 A	–
Basic I/O units (input units)	CJ1W-ID211	2	0.08 A	–
	CJ1W-ID231	2	0.09 A	–
Basic I/O units (output units)	CJ1W-OC201	2	0.09 A	0.048 A
Special I/O unit	CJ1W-DA041	1	0.12 A	–
CPU bus unit	CJ1W-SCU22	1	0.28 A	–
Current consumption	Total		1.9 A + 0.02 A + 0.08 A x 2 + 0.09 A x 2 + 0.09 A x 2 + 0.12 A + 0.28	0.048 A x 2
	Result		2.84 A (≤ 6.0 A)	0.096 A (≤ 1.0 A)
Power consumption	Total		2.84 A x 5 V = 14.2 W	0.096 A x 24 V = 2.3 W
	Result		14.2 W + 2.3 W = 16.5 W (≤ 30 W)	

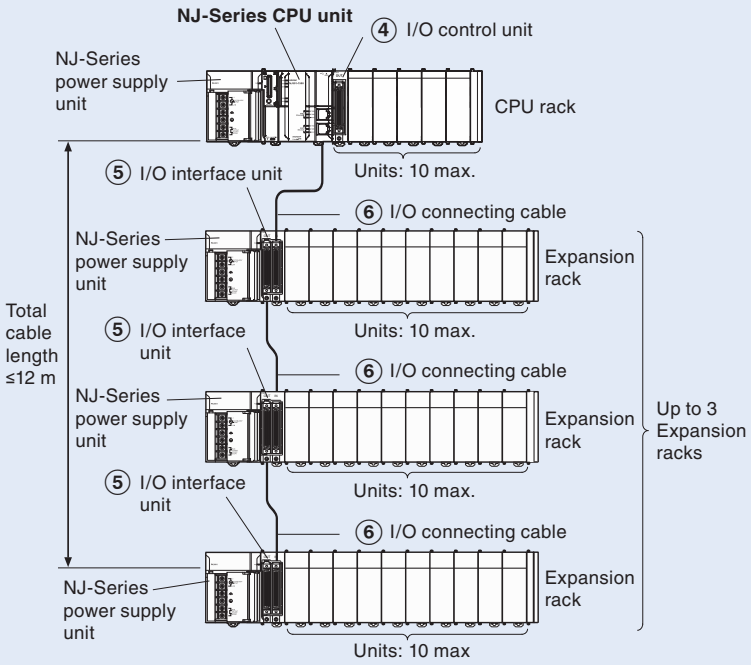
Note: 1. For details on unit current consumption, refer to ordering information.
2. CPU rack and expansion rack current consumption and width can be displayed in the Sysmac Studio software by selecting ***CPU/expansion racks*** from the ***configurations and setup*** in the Multiview Explorer.

Ordering information

NJ-Series system



NJ-Series expansion racks



Power supply units

Symbol	Name	Output capacity			RUN output	Model
		5 VDC	24 VDC	Total		
①	100 to 240 VAC power supply unit for NJ-Series	6.0 A	1.0 A	30 W	Supported	NJ-PA3001
	24 VDC power supply unit for NJ-Series					NJ-PD3001

Note: Power supply units for the CJ Series cannot be used as a power supply for a CPU rack of the NJ System or as a power supply for an expansion rack.

NJ-Series machine controller CPU units

Standard CPU units

Symbol	Name	Program capacity	Variables capacity	I/O capacity	No. of units	Current consumption		Number of axes	Model
						5 VDC	24 VDC		
②	NJ501 CPU unit	20 MB	2 MB: Retained 4 MB: Not retained	2,560 points	CPU rack: 10 units max. Expansion rack: 40 units max. (Up to 3 expansion racks)	1.90 A	–	64	NJ501-1500
								32	NJ501-1400
								16	NJ501-1300
	NJ301 CPU unit	5 MB	0.5 MB: Retained 2 MB: Not retained					8	NJ301-1200
								4	NJ301-1100

CPU units with robotic functionality

Symbol	Name	Program capacity	Variables capacity	I/O capacity	No. of units	Current consumption		Number of axes	Model
						5 VDC	24 VDC		
②	NJ501 CPU Unit	20 MB	2 MB: Retained 4 MB: Not retained	2,560 points	CPU rack: 10 units max. Expansion rack: 40 units max. (Up to 3 expansion racks)	1.90 A	–	64	NJ501-4500
								32	NJ501-4400
								16	NJ501-4300
									NJ501-4310*1

*1. The NJ501-4310 CPU unit only supports one delta robot.

CPU units with SQL client

Symbol	Name	Program capacity	Variables capacity	I/O capacity	No. of units	Current consumption		Number of axes	Model
						5 VDC	24 VDC		
②	NJ501 CPU Unit	20 MB	2 MB: Retained 4 MB: Not retained	2,560 points	CPU Rack: 10 units max. Expansion rack: 40 units max. (Up to 3 expansion racks)	1.90 A	–	64	NJ501-1520
								32	NJ501-1420
								16	NJ501-1320

Note: The end cover unit CJ1W-TER01 is included with the CPU unit.

CJ-Series digital I/O units

Symbol	Points	Type	Rated voltage	Rated current	Width	Remarks	Current consumption (A)		Connection type	Model
							5 VDC	24 VDC		
③	8	AC input	240 VAC	10 mA	31 mm	–	0.08	–	M3	CJ1W-IA201
	16		120 VAC	7 mA	31 mm	–	0.09	–	M3	CJ1W-IA111
	8	DC input	24 VDC	10 mA	31 mm	–	0.08	–	M3	CJ1W-ID201
	16		24 VDC	7 mA	31 mm	–	0.08	–	M3	CJ1W-ID211
					31 mm				Screwless	CJ1W-ID211(SL)
	16		24 VDC	7 mA	31 mm	Fast-response (15 μs is ON, 90 μs is OFF)	0.13	–	M3	CJ1W-ID212
	16		24 VDC	7 mA	31 mm	Inputs start interrupt tasks in PLC program	0.08	–	M3	CJ1W-INT01
	16		24 VDC	7 mA	31 mm	Latches pulses down to 50 μs pulse width	0.08	–	M3	CJ1W-IDP01
	32		24 VDC	4.1 mA	20 mm	–	0.09	–	Fujitsu	CJ1W-ID231
	32		24 VDC	4.1 mA	20 mm	–	0.09	–	MIL	CJ1W-ID232
	32		24 VDC	4.1 mA	20 mm	Fast-response (15 μs is ON, 90 μs is OFF)	0.20	–	MIL	CJ1W-ID233
	64		24 VDC	4.1 mA	31 mm	–	0.09	–	Fujitsu	CJ1W-ID261
	64		24 VDC	4.1 mA	31 mm	–	0.09	–	MIL	CJ1W-ID262
	8	Triac output	250 VAC	0.6 mA	31 mm	–	0.22	–	M3	CJ1W-OA201
	8	Relay contact output	250 VAC	2 A	31 mm	–	0.09	0.048	M3	CJ1W-OC201
					31 mm				Screwless	CJ1W-OC201(SL)
	16		250 VAC	2 A	31 mm	–	0.11	0.096	M3	CJ1W-OC211
					31 mm				Screwless	CJ1W-OC211(SL)
	8	DC output (sink)	12 to 24 VDC	2 A	31 mm	–	0.09	–	M3	CJ1W-OD201
	8		12 to 24 VDC	0.5 A	31 mm	–	0.10	–	M3	CJ1W-OD203
	16		12 to 24 VDC	0.5 A	31 mm	–	0.10	–	M3	CJ1W-OD211
					31 mm				Screwless	CJ1W-OD211(SL)
	16		24 VDC	0.5 A	31 mm	Fast-response (15 μs is ON, 80 μs is OFF)	0.15	–	M3	CJ1W-OD213
	32		12 to 24 VDC	0.5 A	20 mm	–	0.14	–	Fujitsu	CJ1W-OD231
	32	DC output (sink)	12 to 24 VDC	0.5 A	20 mm	–	0.14	–	MIL	CJ1W-OD233
	32		24 VDC	0.5 A	20 mm	Fast-response (15 μs is ON, 80 μs is OFF)	0.22	–	MIL	CJ1W-OD234
	64		12 to 24 VDC	0.3 A	31 mm	–	0.17	–	Fujitsu	CJ1W-OD261
	64		12 to 24 VDC	0.3 A	31 mm	–	0.17	–	MIL	CJ1W-OD263

Symbol	Points	Type	Rated voltage	Rated current	Width	Remarks	Current consumption (A)		Connection type	Model
							5 VDC	24 VDC		
③	8	DC output (source)	24 VDC	2 A	31 mm	Short-circuit protection	0.11	–	M3	CJ1W-OD202
	8		24 VDC	0.5 A	31 mm	Short-circuit protection	0.10	–	M3	CJ1W-OD204
	16		24 VDC	0.5 A	31 mm	Short-circuit protection	0.10	–	M3	CJ1W-OD212
					31 mm				Screwless	CJ1W-OD212(SL)
	32		24 VDC	0.3 A	20 mm	Short-circuit protection	0.15	–	MIL	CJ1W-OD232
	64		24 VDC	0.3 A	31 mm	–	0.17	–	MIL	CJ1W-OD262
	16 + 16	DC in + out (source)	24 VDC	0.5 A	31 mm	–	0.13	–	MIL	CJ1W-MD232
	16 + 16	DC in + out (sink)	24 VDC	0.5 A	31 mm	–	0.13	–	Fujitsu	CJ1W-MD231
	16 + 16		24 VDC	0.5 A	31 mm	–	0.13	–	MIL	CJ1W-MD233
	32 + 32		24 VDC	0.3 A	31 mm	–	0.14	–	Fujitsu	CJ1W-MD261
	32 + 32		24 VDC	0.3 A	31 mm	–	0.14	–	MIL	CJ1W-MD263
	32 + 32	DC in + out (TTL)	5 VDC	35 mA	31 mm	–	0.19	–	MIL	CJ1W-MD563

Note: MIL = Connector according to MIL-C-83503 (compatible with DIN 41651/IEC 60603-1).

CJ-Series analogue I/O and control units

Symbol	Points	Type	Ranges	Resolution	Accuracy*	Conversion time	Width	Remarks	Current (A)		Connection type	Model
									5 V	24 V		
③	4	Universal analogue input	0 to 5 V, 1 to 5 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA, K, J, T, L, R, S, B, Pt100, Pt1000, JPt100	V/I: 1/12,000 T/C: 0.1°C RTD: 0.1°C	V: 0.3% I: 0.3% T/C: 0.3% RTD: 0.3%	250 ms/4 points	31 mm	Universal inputs, with zero/span adjustment, configurable alarms, scaling, sensor error detection	0.32	–	M3	CJ1W-AD04U
											Screwless	CJ1W-AD04U(SL)
	4	Analogue input	0 to 5 V, 0 to 10 V, –10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	V: 0.2% I: 0.4%	250 μs/point	31 mm	Offset/gain adjustment, peak hold, moving average, alarms	0.42	–	M3	CJ1W-AD041-V1
											Screwless	CJ1W-AD041-V1(SL)
	4	High-speed analogue input	1 to 5 V, 0 to 10 V, –5 to 5 V, –10 to 10 V, 4 to 20 mA	1/40,000	V: 0.2% I: 0.4%	35 μs/4 points	31 mm	Direct conversion (CJ2H special instruction)	0.52	–	M3	CJ1W-AD042
	8	Analogue input	1 to 5 V, 0 to 10 V, –10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	V: 0.2% I: 0.4%	250 μs/point	31 mm	Offset/gain adjustment, peak hold, moving average, alarms	0.42	–	M3	CJ1W-AD081-V1
											Screwless	CJ1W-AD081-V1(SL)
	2	Analogue output	0 to 5 V, 0 to 10 V, –10 to 10 V, 1 to 5 V, 4 to 20 mA	1/4,000	V: 0.3% I: 0.5%	1 ms/point	31 mm	Offset/gain adjustment, output hold	0.12	0.14	M3	CJ1W-DA021
											Screwless	CJ1W-DA021(SL)
	4	Analogue output	1 to 5 V, 0 to 10 V, –10 to 10 V, 1 to 5 V, 4 to 20 mA	1/4,000	V: 0.3% I: 0.5%	1 ms/point	31 mm	Offset/gain adjustment, output hold	0.12	0.2	M3	CJ1W-DA041
											Screwless	CJ1W-DA041(SL)
	4	High-speed analogue output	1 to 5 V, 0 to 10 V, –10 to 10 V	1/40,000	0.3%	35 μs/4 points	31 mm	Direct conversion (CJ2H special instruction)	0.40	–	M3	CJ1W-DA042V
	8	Voltage output	1 to 5 V, 0 to 10 V, –10 to 10 V, 1 to 5 V	1/8,000	0.3%	250 μs/point	31 mm	Offset/gain adjustment, output hold	0.14	0.14	M3	CJ1W-DA08V
											Screwless	CJ1W-DA08V(SL)
	8	Current output	4 to 20 mA	1/8,000	0.5%	250 μs/point	31 mm	Offset/gain adjustment, output hold	0.14	0.17	M3	CJ1W-DA08C
											Screwless	CJ1W-DA08C(SL)
	4 + 2	Analogue in + out	1 to 5 V, 0 to 10 V, –10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	in: 0.2% out: 0.3%	1 ms/point	31 mm	Offset/gain adjustment, scaling, peak hold, moving average, alarms, output hold	0.58	–	M3	CJ1W-MAD42
											Screwless	CJ1W-MAD42(SL)
	4	Universal analogue input	DC voltage, DC current, thermocouple, Pt100/Pt1000, potentiometer	1/256,000	0.05%	60 ms/4 points	31 mm	All inputs individually isolated, configurable alarms, maintenance functions, user-defined scaling, zero/span adjustment	0.30	–	M3	CJ1W-PH41U
	2	Process input	4 to 20 mA, 0 to 20 mA, 0 to 10 V, –10 to 10 V, 0 to 5 V, –5 to 5 V, 1 to 5 V, 0 to 1.25 V, 1.25 to 1.25 V	1/64,000	0.05%	5 ms/point	31 mm	Configurable alarms, maintenance functions, user-defined scaling, zero/span adjustment, square root, totaliser	0.18	0.09	M3	CJ1W-PDC15

Symbol	Points	Type	Ranges	Resolution	Accuracy*	Conversion time	Width	Remarks	Current (A)		Connection type	Model
									5 V	24 V		
③	6	Temperature control loops, thermocouple	K-type (–200 to 1,300°C) J-type (–100 to 850ºC)	0.1°C	0.5%	40 ms/point	31 mm	Basic I/O unit, setup by DIP switches, adjustable filtering 10/50/60 Hz	0.22	–	M3	CJ1W-TS561
											Screwless	CJ1W-TS561 (SL)
	6	Temperature control loops	Pt100 (–200 to 650°C) Pt1000 (–200 to 650°C)	0.1°C	0.5%	40 ms/point	31 mm	Basic I/O unit, setup by DIP switches, adjustable filtering 10/50/60 Hz	0.25	–	M3	CJ1W-TS562
											Screwless	CJ1W-TS562 (SL)
	2	Temperature control loops, thermocouple	B, J, K, L, R, S, T	0.1°C	0.3%	500 ms total	31 mm	Open collector NPN outputs	0.25	–	M3	CJ1W-TC003
	2	Temperature control loops, thermocouple	B, J, K, L, R, S, T	0.1°C	0.3%	500 ms total	31 mm	Open collector PNP outputs	0.25	–	M3	CJ1W-TC004
	2	Temperature control loops	Pt100, JPt100	0.1°C	0.3%	500 ms total	31 mm	Open collector NPN outputs	0.25	–	M3	CJ1W-TC103
	2	Temperature control loops	Pt100, JPt100	0.1°C	0.3%	500 ms total	31 mm	Open collector PNP outputs	0.25	–	M3	CJ1W-TC104

* Accuracy for voltage and current inputs/outputs as percentage of full scale and typical value at 25°C ambient temperature (consult the operation manual for details)
Accuracy for temperature inputs/outputs as percentage of process value and typical value at 25°C ambient temperature (consult the operation manual for details)

CJ-Series special I/O units

Symbol	Channels	Type	Signal type	Width	Remarks	Current consumption (A)		Connection type	Model
						5 V	24 V		
③	2	500 kHz Counter	24 V, line driver	31 mm	2 configurable digital inputs + outputs	0.28	–	Fujitsu	CJ1W-CT021
	4	100 kHz Counter	Line driver, 24 V via terminal block		Target values trigger interrupt to CPU	0.32	–	1 × MIL (40 pt)	CJ1W-CTL41-E

CJ-Series communication units

Symbol	Type	Ports	Data transfer	Protocols	Width	Current consumption (A)		Connection type	Model
						5 V	24 V		
③	Serial communications units	2 × RS-232C	High-speed	CompoWay/F, host link, NT link, Modbus, user-defined	31 mm	0.28	–	9 pin D-Sub	CJ1W-SCU22
		2 × RS-422A/RS-485			31 mm	0.28	–	9 pin D-Sub	CJ1W-SCU32
		1 × RS-232C + 1 × RS-422/RS-485			31 mm	0.28	–	9 pin D-Sub	CJ1W-SCU42
	EtherNet/IP	1 × 100 Base-Tx	–	EtherNet/IP, UDP, TCP/IP, FTP server, SNTP, SNMP	31 mm	0.41	–	RJ45	CJ1W-EIP21*1
	DeviceNet	1 × CAN	–	DeviceNet	31 mm	0.29	–	5-p detachable	CJ1W-DRM21
	CompoNet	4-wire, data + power to slaves (Master)	–	CompoNet (CIP-based)	31 mm	0.4	–	4-p detachable IDC or screw	CJ1W-CRM21*2
	PROFIBUS-DP	1 × RS-485 (Master)	–	DP, DPV1	31 mm	0.40	–	9 pin D-Sub	CJ1W-PRM21
		1 × RS-485 (Slave)	–	DP	31 mm	0.40	–		CJ1W-PRT21
	PROFINET-IO	1 × 100 Base-Tx	–	PROFINET-IO controller, FINS/UDP	31 mm	0.42	–	RJ45	CJ1W-PNT21
	RS-422A converter accessory	RS-232C to RS-422A/RS-485 signal converter. Mounts directly on serial port						9 pin D-Sub to screw clamp terminals	CJ1W-CIF11

*1. Supported only by the EtherNet/IP units with unit version 2.1 or later, CPU units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.

*2. Supported only by the CPU units with unit version 1.01 or higher and the Sysmac Studio version 1.02 or higher.

CJ-Series ID sensor units

Symbol	Type	Specifications				Current consumption (A)		Model
		Connected ID systems	No. of connected R/W heads	External power supply	No. of unit numbers allocated	5 V	24 V	
③	ID sensor units	V680-Series RFID system	1	Not required	1	0.26*1	0.13*1	CJ1W-V680C11
			2		2	0.32	0.26	CJ1W-V680C12

*1. To use a V680-H01 antenna, refer to the V680 Series RFID system catalog (Cat. No. Q151)

Note: The data transfer function using intelligent I/O commands can not be used.

Expansion Racks

CJ-Series I/O control unit (mounted on CPU rack when connecting expansion racks)

Symbol	Name	Connecting cable	Connected Unit	Width	Current consumption (A)		Model
					5 V	24 V	
④	CJ-Series I/O control unit	CS1W-CN□□3	CJ1W-II101	20 mm	0.02 A	–	CJ1W-IC101

Note: Mount to the right of the power supply unit.

CJ-Series I/O interface unit (mounted on expansion rack)

Symbol	Name	Connecting cable	Width	Current consumption (A)		Model
				5 V	24 V	
⑤	CJ-Series I/O interface unit	CS1W-CN□□3	31 mm	0.13 A	-	CJ1W-II101

Note: Mount to the right of the power supply unit.

I/O connecting cables

Symbol	Name	Specifications		Model
⑥	I/O connecting cable	• Connects an I/O control unit on NJ-Series CPU rack to an I/O interface unit on a NJ-Series expansion rack. or • Connects an I/O interface unit on NJ-Series expansion rack to an I/O interface unit on another NJ-Series expansion rack.	Cable length: 0.3 m	CS1W-CN313
			Cable length: 0.7 m	CS1W-CN713
			Cable length: 2 m	CS1W-CN223
			Cable length: 3 m	CS1W-CN323
			Cable length: 5 m	CS1W-CN523
			Cable length: 10 m	CS1W-CN133
			Cable length: 12 m	CS1W-CN133-B2

EtherCAT junction slave

Symbol	Name	No. of ports	Power supply voltage	Current consumption (A)	Dimensions (W x D x H)	Weight	Model	Appearance
⑦	EtherCAT junction slave	3	20.4 to 28.8 VDC (24 VDC –15 to 20%)	0.08	25 mm × 78 mm × 90 mm	165 g	GX-JC03	
		6		0.17	48 mm × 78 mm × 90 mm	220 g	GX-JC06	

Note: **1.** Please do not connect EtherCAT junction slave with OMRON position control unit, Model CJ1W-NC□81/□82
2. EtherCAT junction slave cannot be used for Ethernet/IP and Ethernet.

Industrial switching hubs

Symbol	Specifications			Accessories	Current consumption (A)	Model	Appearance
	Functions	No. of ports	Failure detection				
⑧	Quality of Service (QoS): EtherNet/IP control data priority. Failure detection: Broadcast storm and LSI error detection 10/100 BASE-TX, Auto-Negotiation	3	No	Power supply connector	0.22	W4S1-03B	
		5	No		0.22	W4S1-05B	
		5	Yes	Power supply connector and connector for informing error	0.22	W4S1-05C	

Recommended EtherCAT and EtherNet/IP communication cables

Symbol	Item			Manufacturer	Cable colour	Cable length (m)	Model
⑨	Ethernet patch cable	Cat 6a, AWG27, 4-pair cable Cable sheath material: LSZH*1 **Note:** This cable is available in yellow, green and blue colours.	Standard type Cable with connectors on both ends (RJ45/RJ45) 	OMRON	Yellow	0.2	XS6W-6LSZH8SS20CM-Y
						0.3	XS6W-6LSZH8SS30CM-Y
						0.5	XS6W-6LSZH8SS50CM-Y
						1	XS6W-6LSZH8SS100CM-Y
						1.5	XS6W-6LSZH8SS150CM-Y
						2	XS6W-6LSZH8SS200CM-Y
						3	XS6W-6LSZH8SS300CM-Y
						5	XS6W-6LSZH8SS500CM-Y
						7.5	XS6W-6LSZH8SS750CM-Y
						10	XS6W-6LSZH8SS1000CM-Y
						15	XS6W-6LSZH8SS1500CM-Y
						20	XS6W-6LSZH8SS2000CM-Y
					Green	0.2	XS6W-6LSZH8SS20CM-G
						0.3	XS6W-6LSZH8SS30CM-G
						0.5	XS6W-6LSZH8SS50CM-G
						1	XS6W-6LSZH8SS100CM-G
						1.5	XS6W-6LSZH8SS150CM-G
						2	XS6W-6LSZH8SS200CM-G
						3	XS6W-6LSZH8SS300CM-G
						5	XS6W-6LSZH8SS500CM-G
						7.5	XS6W-6LSZH8SS750CM-G
						10	XS6W-6LSZH8SS1000CM-G
						15	XS6W-6LSZH8SS1500CM-G
						20	XS6W-6LSZH8SS2000CM-G
		Cat 5, AWG26, 4-pair cable Cable sheath material: PUR*1	Standard type Cable with connectors on both ends (RJ45/RJ45) 		Green	0.5	XS6W-5PUR8SS50CM-G
						1	XS6W-5PUR8SS100CM-G
						1.5	XS6W-5PUR8SS150CM-G
						2	XS6W-5PUR8SS200CM-G
						3	XS6W-5PUR8SS300CM-G
						5	XS6W-5PUR8SS500CM-G
						7.5	XS6W-5PUR8SS750CM-G
						10	XS6W-5PUR8SS1000CM-G
						15	XS6W-5PUR8SS1500CM-G
						20	XS6W-5PUR8SS2000CM-G
		Cat5, AWG22, 2-pair cable	Rugged type Cable with connectors on both ends (RJ45/RJ45) 		Grey	0.3	XS5W-T421-AMD-K
						0.5	XS5W-T421-BMD-K
						1	XS5W-T421-CMD-K
						2	XS5W-T421-DMD-K
						3	XS5W-T421-EMD-K
						5	XS5W-T421-GMD-K
						10	XS5W-T421-JMD-K
						15	XS5W-T421-KMD-K
			Rugged type Cable with connectors on both ends (M12 straight/RJ45) 		Grey	0.3	XS5W-T421-AMC-K
						0.5	XS5W-T421-BMC-K
						1	XS5W-T421-CMC-K
						2	XS5W-T421-DMC-K
						3	XS5W-T421-EMC-K
						5	XS5W-T421-GMC-K
						10	XS5W-T421-JMC-K
						15	XS5W-T421-KMC-K
			Rugged type Cable with connectors on both ends (M12 L right angle/RJ45) 		Grey	0.3	XS5W-T422-AMC-K
						0.5	XS5W-T422-BMC-K
						1	XS5W-T422-CMC-K
						2	XS5W-T422-DMC-K
						3	XS5W-T422-EMC-K
						5	XS5W-T422-GMC-K
						10	XS5W-T422-JMC-K
						15	XS5W-T422-KMC-K
	Ethernet installation cable	Cat 5, SF/UTP, 4 × 2 × AWG 24/1 (solid core), Polyurethane (PUR)		Weidmüller	Green	100	WM IE-5IC4x2xAWG24/1-PUR
		Cat 5, SF/UTP, 4 × 2 × AWG 26/7 (stranded core), Polyurethane (PUR)			Green	100	WM IE-5IC4x2xAWG26/7-PUR
	Connectors	RJ45 metallic connector For AWG22 to AWG26			–	–	WM IE-T0-RJ45-FH-BK
		RJ45 plastic connector For AWG22 to AWG24		OMRON	–	–	XS6G-T421-1
	RJ45 socket	DIN-rail mount socket to terminate installation cable in the cabinet		Weidmüller	–	–	WM IE-T0-RJ45-FJ-B

*1. The lineup features low smoke zero halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.

Note: Please be careful while cable processing, for EtherCAT, connectors on both ends should be shield connected and for EtherNet/IP, connectors on only one end should be shield connected.

WE70 FA wireless LAN units

Name	Area	Type	Model	Appearance
WE70 FA wireless LAN units	Europe	Access point (Master)	WE70-AP-EU	
		Client (Slave)	WE70-CL-EU	
Directional magnetic-base antenna		1 set with two antennas, 2.4 GHz/5 GHz Dual-band compatible	WE70-AT001H	
DIN rail mounting bracket		For TH35 7.5	WT30-FT001	
		For TH35 15	WT30-FT002	
Antenna extension cable		5 m	WE70-CA5M	

Note: Special versions are available for USA, Canada, China and Japan.

NS HMI Series

Symbol	Type		Case color	Model
⑩	TFT, 15”, 1024 × 768 pixels	EtherNet	Black	NS15-TX01B-V2
			Silver	NS15-TX01S-V2
	TFT, 12”, 800 × 600 pixels		Black	NS12-TS01B-V2
			Ivory	NS12-TS01-V2
	TFT, 10”, 640 × 480 pixels		Black	NS10-TV01B-V2
			Ivory	NS10-TV01-V2
	TFT, 8.4”, 640 × 480 pixels		Black	NS8-TV01B-V2
			Ivory	NS8-TV01-V2
	TFT, 5.7”, 320 × 240 pixels		Black	NS5-TQ11B-V2
			Ivory	NS5-TQ11-V2
	TFT, 5.7”, 320 × 240 pixels		Black	NS5-SQ11B-V2
			Ivory	NS5-SQ11-V2
	STN, Monochrome 5.7”, 320 × 240 pixels		Black	NS5-MQ11B-V2
			Ivory	NS5-MQ11-V2

Note: To connect the NJ-Series Controller, NS System version 8.5 or higher is required. CX-Designer version 3.3 or higher is also required.

NS HMI Accessories

Name	Specifications		Model
Cable	Serial programming cable		XW2Z-S002
	USB programming cable		CP1W-CN221
Video input unit	Inputs: 4 channels Signal type: NTSC/PAL		NS-CA001
	Input channels: 2 video channels and 1 RGB channel *1 Signal type: NTSC/PAL		NS-CA002
Cable to connect NS-CA00_ to video console unit	Cable length: 2 m		F150-VKP (2 m)
	Cable length: 5 m		F150-VKP (5 m)
Sheet/cover	Anti-reflection sheets (5 surface sheets)	NS15	NS15-KBA04
		NS12/10	NS12-KBA04
		NS8	NS7-KBA04
		NS5	NT30-KBA04
	Protective covers (5 pack) (anti-reflection coating)	NS12/10	NS12-KBA05
		NS8	NS7-KBA05
		NS5	NT31C-KBA05
	Protective covers (1 cover included, transparent)	NS15	NS15-KBA05N
	Protective covers (5 covers included, transparent)	NS12/10	NS12-KBA05N
		NS8	NS7-KBA05N
		NS5	NT31C-KBA05N
	Chemical-resistant cover (1 cover)	NS5	NT30-KBA01
Attachment adapter	NT625C/631/631C-Series to NS12/10-Series		NS12-ATT01
	NT625C/631/631C-Series to NS12/10-Series (Black)		NS12-ATT01B
	NT610C-Series to NS12/10-Series		NS12-ATT02
	NT620S/620C/600S-Series to NS8-Series		NS8-ATT01
	NT600M/600G/610G/612G-Series to NS8-Series		NS8-ATT02
Memory card	128 MB		HMC-EF183
	256 MB		HMC-EF283
	512 MB		HMC-EF583
Memory card adapter for PC	–		HMC-AP001
Replacement battery	Battery life: 5 years (at 25°C)		CJ1W-BAT01

*1. One screen cannot display two videos inputs simultaneously.

NJ-Series options and accessories

Specifications		Model	Appearance
SD memory card, 2 GB		HMC-SD291	
DIN track	Length: 0.5 m; height: 7.3 mm	PFP-50N	
	Length: 1 m; height: 7.3 mm	PFP-100N	
	Length: 1 m; height: 16 mm	PFP-100N2	
End plate to secure the units on the DIN track (2 pieces are included with the CPU unit and I/O interface unit)		PFP-M (2 pcs)	
Battery for NJ-Series CPU unit (The battery is included with the CPU unit)		CJ1W-BAT01	
End cover (The end cover is included with each CPU unit and I/O interface unit)		CJ1W-TER01	

Computer software

Symbol	Specifications	Model
⑪	Sysmac Studio	SYSMAC-SE2□□□

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. SysCat_I180E-EN-03A In the interest of product improvement, specifications are subject to change without notice.